

Figure 1: *pQE(Sp1)*, Nucleic Acid Sequence (designated SEQ ID NO. 1)

ATGAGAGGATCGCATCACCATCACCATCACGGATCCATGGCTAGCGGTAGAGGCAGGGCTGGGTGGCCAG
GGTGCAGGTGCGGCTGCGGCTGCCGCAGCGGCCAGGCAGGTGGCTATGGCGGC
CTGGGTTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCGGCTGCC
GCGGCAGCGGCCGAGCGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTTCTCAGGGGACTAGCGGT
AGAGGCAGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGCAGGTGC
CGGCCAAGGTGGCTATGGCGGCCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGGCCAGGG
TGCAGGTGCGGCTGCCGCCAGCGGCCAGGGTGCAGGTGCCGCCAAGGTGGCTATGGCGGCC
GGGTTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCCGCC
GGCAGCGGCCGAGCGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTTCTCAGGGGACTAGCGGTAG
AGGCAGGGCTGGGTGGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGG
CGGTGCCGCCAAGGYGGCTATGGCGGCCCTGGGTTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGG
CCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGTGCAGGTGCCGCCAAGGTGGCTATGG
CGGCCTGGGTTCTCAGGGGACTAGTGGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

Figure 2: pQE(Sp1)7 Amino Acid Sequence (designated SEQ ID NO. 2)

MRGSHHHHHGSMASGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAA
AAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGL
GQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQ
GTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQ
GGYGGLGSQGTSGIRRPAAKLN.

Figure 3. *pQE-1/(SP1)/(SP2)J₄* Nucleic Acid Sequence (designated SEQ ID NO. 3)

ATGAGAGGATCGCATCACCATCACCATCACGGATCCATGGCTAGCGGTAGAGGCAGGGCTGGGTGCCAG
GGTGCAGGTGCGGCTGCGGCTGCCGCCAGCGCGCAGGGCGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCAGGG
CTGGGTTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCAGGG
GCCAGCGGCCGAGCGGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGG
AGAGGCGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCAGGGCAGGTGC
CGGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGG
TGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTGCCAGGG
GGTTCTCAGGGGACTAGCGGTCCGGCGGTTATGGTCCGGTCAACAAACTAGCGGTAGAGGCAGGG
GGTGGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGGTGCAGGTGCGGCTGCCGCC
GCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGG
CTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGG
GGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCC
GCAGGCAGGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGG
GGTGGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTAGAGGCAGGG
CTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTCCGGCGGTTATGGTCCGGTCAACAAACTAGCGG
TAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGT
CCGGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGG
GTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTATGGCGGCC
TGGGTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCC
CGCAGCGGCCAGCGGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTA
GAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGT
GCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTCCGGCGGTTATGGTCCGGTCAA
CAAACATAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGC
CGCAGGCAGGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGG
GGTGGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTAGAGGTGG
GCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGG
CTGCGGCTGCCGCCAGCGGCCAGGGCGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGG
GGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCGGCTGCCGCCAGCGGCC
GCAGGCAGGTGCCGCCAGGTGGCTATGGCGGCCCTGGGTCTCAGGGGACTAGCGGTCCGGCGGTTAT
GGTCCGGGTCAACAAACTAGTGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

Figure 4: pQE [(SP1)₄/(SP2)₁]₄Amino Acid Sequence (designated SEQ ID NO. 4)

MRGSHHHHHGSMASGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAA
AAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGG
GLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGPQQTSRGGLGGQGAGAAAAAAAAAA
AGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAG
AAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGP
GGYGPQQTSRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAA
AAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQG
AGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGPQQTSRGGLGGQGAGAAAAAAAAAAAGGAG
QGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAA
AAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGP
QQTSIGRPAKLN.

Figure 5: *pET/(SP1)/(SP2)I*, Nucleic Acid Sequence (designated SEQ ID NO. 5)

ATGGCTAGCATGACTGGTGGACAGCAAATGGGTCGCGGATCCATGGCTAGCGGTAGAGGCAGGGCTGGT
GGCCAGGGTGCAGGTGCGGCTGCGGCTGCCGCGCAGCGGCCGAGCGGGTGCAGGGCCAAGGTGGCTAT
GGCGGCTGGTTCTCAGGGACTAGCGGTAGAGGCAGGGCTGGGTGCAGGGTGCAGGTGCAGGGCTGC
GCTGCCGCGGCAAGGGCCAGGGTGCAGGTGCAGGGCTGCAGGGTGCAGGTGCAGGGCTGC
AGCGGTAGAGGCAGGGCTGGGTGCAGGTGCAGGGTGCAGGTGCAGGGTGCAGGTGCAGGGCTGC
CGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTAGAGGCAGGGCTGGT
CCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAGGGTGCAGGTGCAGGGCTGC
CGGCCTGGTTCTCAGGGACTAGCGGTCCGGCGTTATGGTCCGGTCAACAAACTAGCGGTAGAGG
CGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGTGCAGGTGCAGGGCTGCCGCC
AGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTAGAGGCAGGGCTGGTGCAGGGTGC
TGCAGGGCTGCCGCCAGGGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGTGCAGGTGCAGGGCTGC
TCAGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAG
CGGCCGCAGGGCGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTAGAGG
GGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAGGGTGCAGGGCTGCCGCC
GGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTCCGGCGTTATGGTCCGGTCAACAAACT
AGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAG
CGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTCCGGCGTTATGGTCC
CCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGG
CGGCCTGGTTCTCAGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGC
TGCAGGGCTGCCGCCAGGGCGGTGCCGCCAGGGCCAGGGTGCAGGTGCAGGGCTGCCGCC
CGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAGGG
GTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTCCGGCGTTATGGTCC
GTCAACAAACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCC
GCCGCCGCAGGGCGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTAGAGG
GGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAGGGCCAGGGTGCAGGGCTGCCGCC
AGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGC
TGCAGGGCTGCCGCCAGGGCGGTGCCGCCAGGGCCAGGGTGCAGGTGCAGGGCTGCCGCC
TCAGGGACTAGCGGTAGAGGCAGGGCTGGGTGCCAGGGTGCAGGTGCAGGGCTGCCGCCAG
CGGCCGCAGGGCGGTGCCGCCAAGGTGGCTATGGCGGCCCTGGGTCTCAGGGACTAGCGGTCC
GTTATGGTCCGGTCAACAAACTAGTGGGATCCGAATTGAGCTCCGTGACAAGCTCGAGCAC
ACCACCAACTGA

Figure 6: pET [(SP1)₄/(SP2)₁₁]₄Amino Acid Sequence (designated SEQ ID NO. 6)

MASMTGGQQMGRGSMASGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGA
AAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGG
GLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGPGGYGPGQQTSGRGGLGGQGAGAAAAAAAA
GGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAA
AAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGP
GGYGPGQQTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAA
GAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAA
AAAAAAAGGAGQGGYGGLGSQGTSGPGGYGPGQQTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGG
GSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGG
AGQGGYGGLGSQGTSGRGGLGGQGAGAAAAAAAAAGGAGQGGYGGLGSQGTSGP
GGYGPGQQTSGIRIR
APSTSFEHHHHHH

Figure 7: *pETNcDS* Nucleic Acid Sequence (designated SEQ ID NO. 7)

ATGGCTAGCATGACTGGTGGACAGCAAATGGGTGGATCCGAATTCTGGATATGGAGGTCTTGGTGG
CAAGGTGCCGGACAAGGAGCTGGTGCAGCCGCCAGCAGCAGCTGGTGGGCCGGACAAGGAGGATA
TGGAGGTCTTGGAAAGCCAAGGTGCTGGACGAGGTGGACAAGGTGCAAGCGCAGCCGCAGCCGAGCTG
GAGGTGCTGGTCAAGGAGGATACGGAGGTCTTGGAAAGCCAAGGTGCTGGACGAGGAGGATTAGGTGG
CAAGGTGCAGGTGCAGCAGCAGCTGGAGGTGTCAGCAGCTGGTGGGCCGGACAAGGAGGACTAGGTGGACAAGGTGCTGG
ACAAGGAGCTGGAGCAGCTGCTGCAGCAGCTGGTGGGCCGGACAAGGAGGATATGGAGGTCTGGAA
GCCAAGGTGCAGGACGAGGTGGATCAGGTGGACAAGGGCAGGTGCAAGCAGCAGCAGCAGCTGGAGGT
GCCGGACAAGGAGGATATGGAGGTCTTGGAAAGCCAAGGTGCAAGGACGAGGTGGATTAGGTGGACAGGG
TGCAGGTGCAGCAGCAGCAGCAGCCGGAGGTGCTGGACAAGGAGGATACGGTGGTCTTGGTGGAC
AAGGTGCCGGACAAGGTGGCTATGGAGGACTTGGAAAGCCAAGGTGCTGGACGAGGAGGATTAGGTGG
CAAGGTGCAGGTGCAGCAGCAGCTGGAGGTGCCGGACAAGGAGGACTAGGTGGACAAGGAGCTGG
AGCAGCCGCTGCAGCAGCTGGTGGGCCGGACAAGGAGGATATGGAGGTCTTGGAAAGCCAAGGTGCTG
GACGAGGTGGACAAGGTGCAGCGCAGCCGCAGCAGCAGCCGGAGGTGCTGGACAAGGAGGATACGGT
GGACAAGGTGCCGGACAAGGAGGCTATGGAGGACTTGGAAAGCCAAGGTGCTGGACGAGGAGGATTAGG
TGGACAAGGTGCAGGTGCAGCAGCAGCAGCAGCTGGAGGTGCTGGACAAGGAGGATTAGGTGGACAAGGT
GCTGGACAAGGAGCTGGAGCAGCCGCTGCAGCAGCCGCTGCAGCAGCTGGTGGTTAGACAAGGAGG
ATATGGAGGTCTTGGAAAGCCAAGGTGCTGGACGAGGTGGACAAGGTGCAAGGCCAGCCGAGCAG
CCGGAGGTGCTGGACAAGGAGGATATGGTGGTCTTGGACAAGGTGTTGGACGAGGTGGATTAGGTG
GACAAGGTGCAGCGCAGCGCAGCTGGTGGCTGGACAAGGAGGATATGGTGGTGTGGTTCTGGGG
CGTCTGCTGCCTCTGCAGCTGCATCCCGTTGTCTTCTCCTCAAGCTAGTTCAAGAGTTTCATCAGCTGTT
TCCAACCTGGTGCAGTGGTCTACTAATTCTGGCGCTTGTCAAGTACAATCAGTAATGTGGTTTCAC
AAATAGGCGCCAGCAATCCTGGTCTTCTGGATGTGATGTCTCATTCAAGCTCTCTCGAGCACCA
CCACCACTGAA

Figure 8: pETNcDS Amino Acid Sequence (designated SEQ ID NO.8)

MASMTGGQQMGRIRIRGYGGLGGQAGQQAGAAAAAAAGGAGQQGYGGLGSQAGRGGQAGAAAAA
AGGAGQQGYGGLGSQAGRGGLGGQAGAAAAAAGGVGQQGLGGQAGQQAGAAAAAAGGAGQQGYG
GLGSQGAGRGGSGGQQAGAAAAAAGGAGQQGYGGLGSQGAGRGGLGGQAGAAAAAAGGAGQQGYG
GLGGQQAGQQGYGGLGSQGAGRGGLGGQAGAAAAAAGGAGQQGLGGQAGAAAAAAGGAGQQGYG
GSQQGAGRGGQAGAAAAAAGGAGQQGYGGQAGQQGAGQQGYGGLGSQGAGRGGLGGQAGAAAAAAGGA
GQQGLGGQAGAAAAAAGGAGQQGLGGQAGQQAGAAAAAAAAGGVRQQGYGGLGSQGAGRGGQ
GAGAAAAAAGGAGQQGYGGLGGQVGAGGLGGQAGAAAAGAGQQGYGGVSGASAASAAASRLSS
PQASSRVSSAVSNLVASGPTNSAALSSTISNVVSQIGASNPGLSGCDVLIQALLGHHHHH.

Figure 9: OmpF Amino Acid Sequence, designated SEQ ID NO. 9, without the Signal Sequence (as recovered from *E. coli* by Valeric Acid)

AEIYNKDGNKVDLYGKAVGLHYFSKGNGENSYGGNGDMTYARLGFKGETQINSDLTGYGQWEY
NFQGNSEGADAQTGNKTRLAFLAGKYADVGSFDYGRNYGVVYDALGYTDMLPEFGGDTAYSD
DFFVGRVGGVATYRNSNFFGLVDGLNFAVQYLGKNERDTARRSNGDGVGGSISYEYEGFGIVGAY
GAADRTNLQEAQPLGNGKKAEQWATGLKYDANNIYLAANYGETRNAATPITNKFTNTSGFANKTQ
DVLLVAQYQFDFGLRPSIAYTKSKAKDVEGIGDVLVNYFEVGATYYFNKNMSTYVDIINQIDS
DNKLGVGSSDTVAVGIVYQFA

Figure 10: *Recognin B1* Nucleic Acid Sequence (designated SEQ ID NO. 10)

ATGAGAGGATCGCATCACCATCACCATCACGGATCCATGGCTAGCGGTGACCTGAAAAACAA
AGTGGCCCAGCTGAAAAGGAAAGTTAGATCTCTGAAAGATAAAGCGGCTGAACTGAAACAAAG
AAGTCTCGAGACTGGAAAATGAAATCGAAGACCTGAAAGCCAAAATTGGTGACCTGAATAAC
ACTAGTGGGATCCGTCGACCTGCAGCCAAGCTTAATTAG

Figure 11: Recognin B1 Amino Acid Sequence (designated SEQ ID NO. 11)

MRGSHHHHHGSMASGDLKNKVAQLKRKVRSLKDKAAELKQEVSRLENEIEDLAKIGDLNNNTSGIRRPAAKLN

Figure 12

Comparative Gel of Acid Lysis vs. Traditional Denaturing Conditions

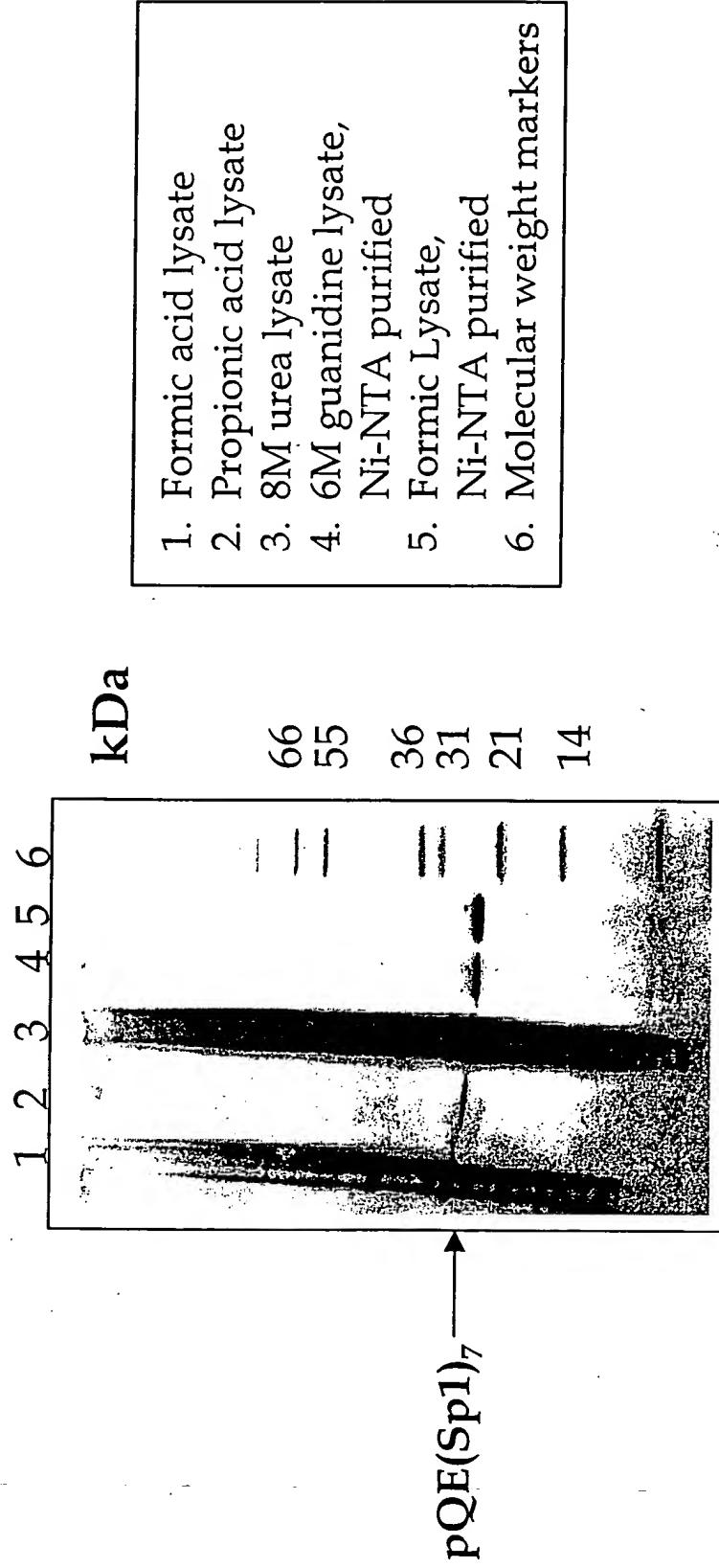


Figure 13

Gel of QAE-Sephadex Purification
of Propionic Acid (PA) Extracted pET[$(Sp1)_4/(Sp2)_1$] $_4$ Protein

1 2 3 4 5

kDa

66 55 36 31 21 14

→ pET[$(Sp1)_4/(Sp2)_1$] $_4$

- 1 Molecular weight markers
- 2 PA Lysate Soluble
- 3 PA Lysate Insoluble
- 4 QAE Column Flowthrough
- 5 QAE Column Wash

Figure 14

QAE-Sephadex Purification of Propionic Acid
and Guanidine-HCl Extracted pETI(SP1)₄/(SP2)₁l₄ Protein

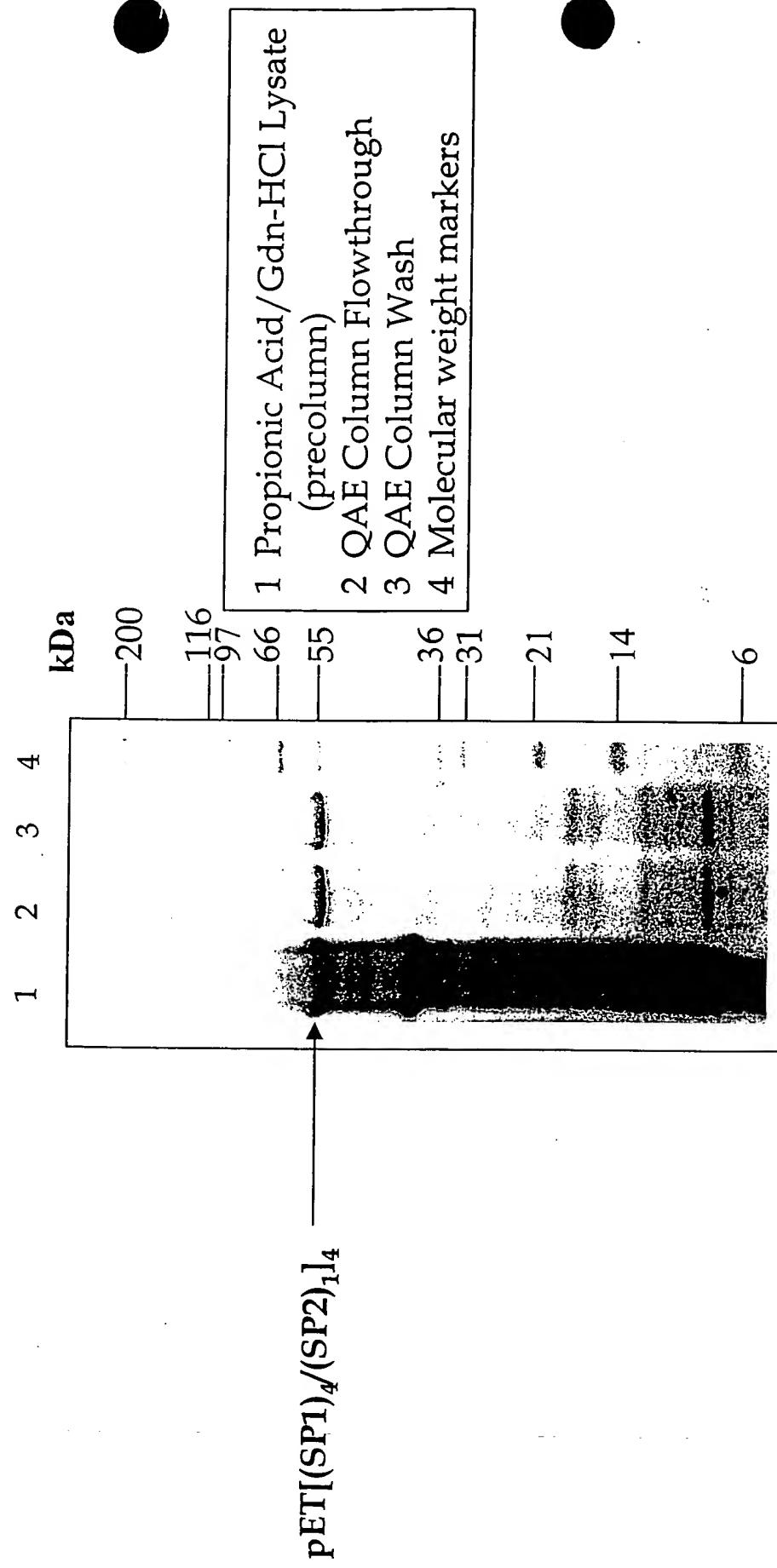


Figure 15

OmpF-Valeric Acid Lysis

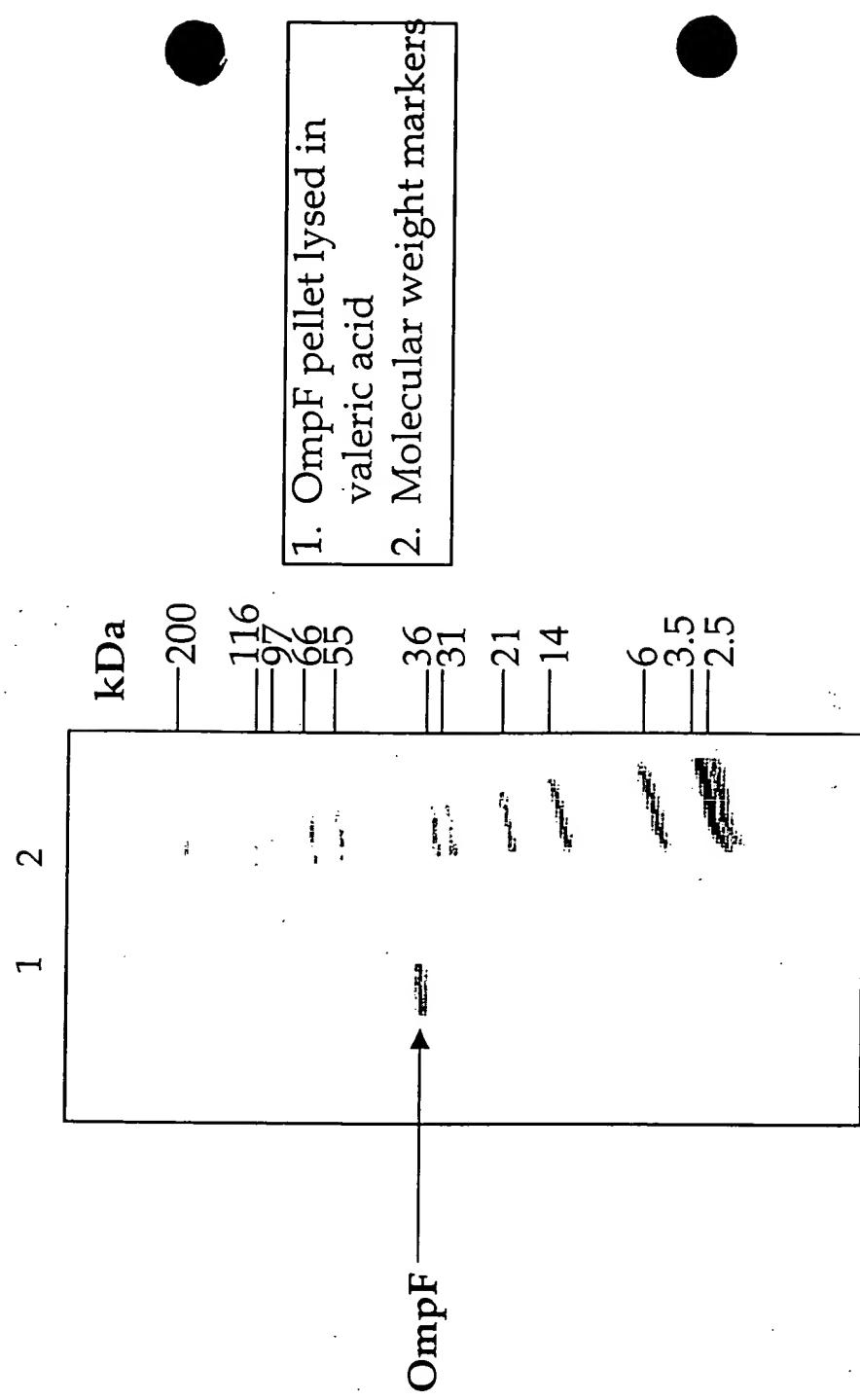


Figure 16

Comparative Gel of Recognin B1 Acid Lysis

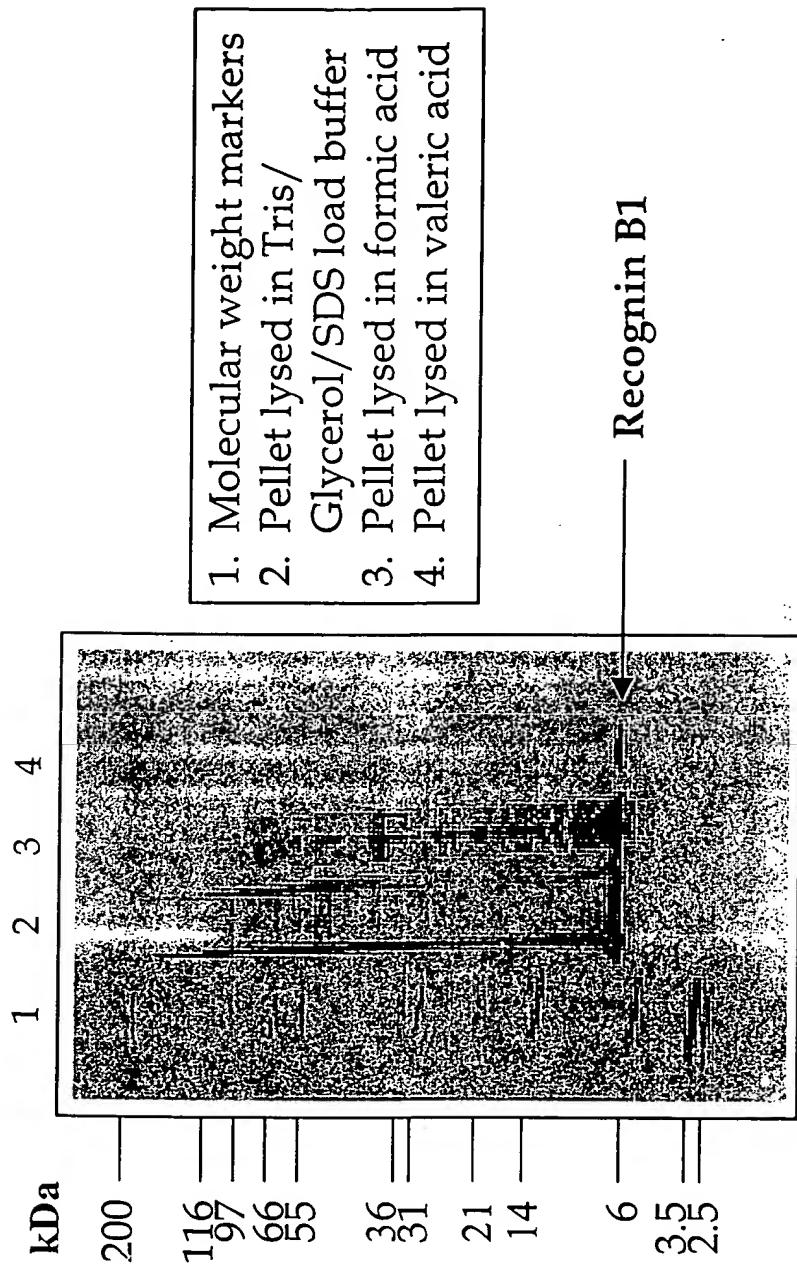
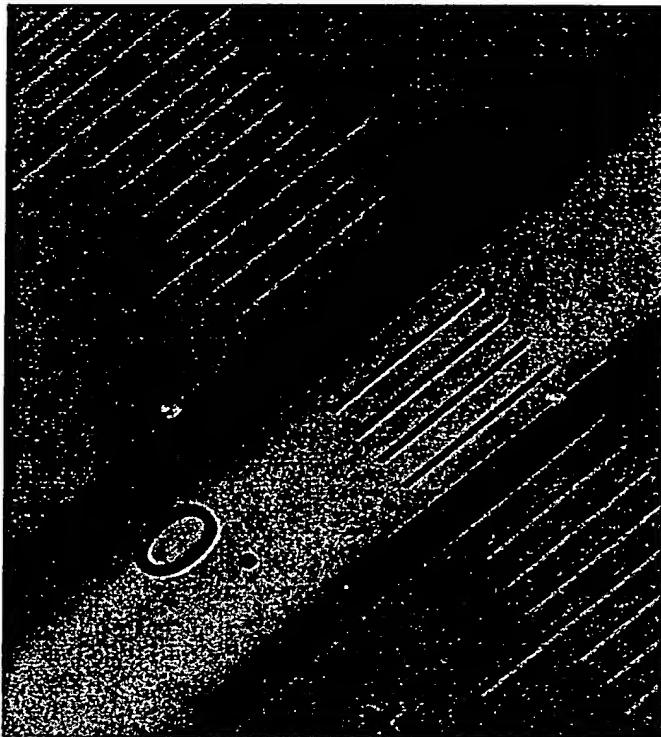


Figure 17

pETNcDS fiber under light microscopy. Spun from 25% protein solution into 90% methanol coagulation bath.

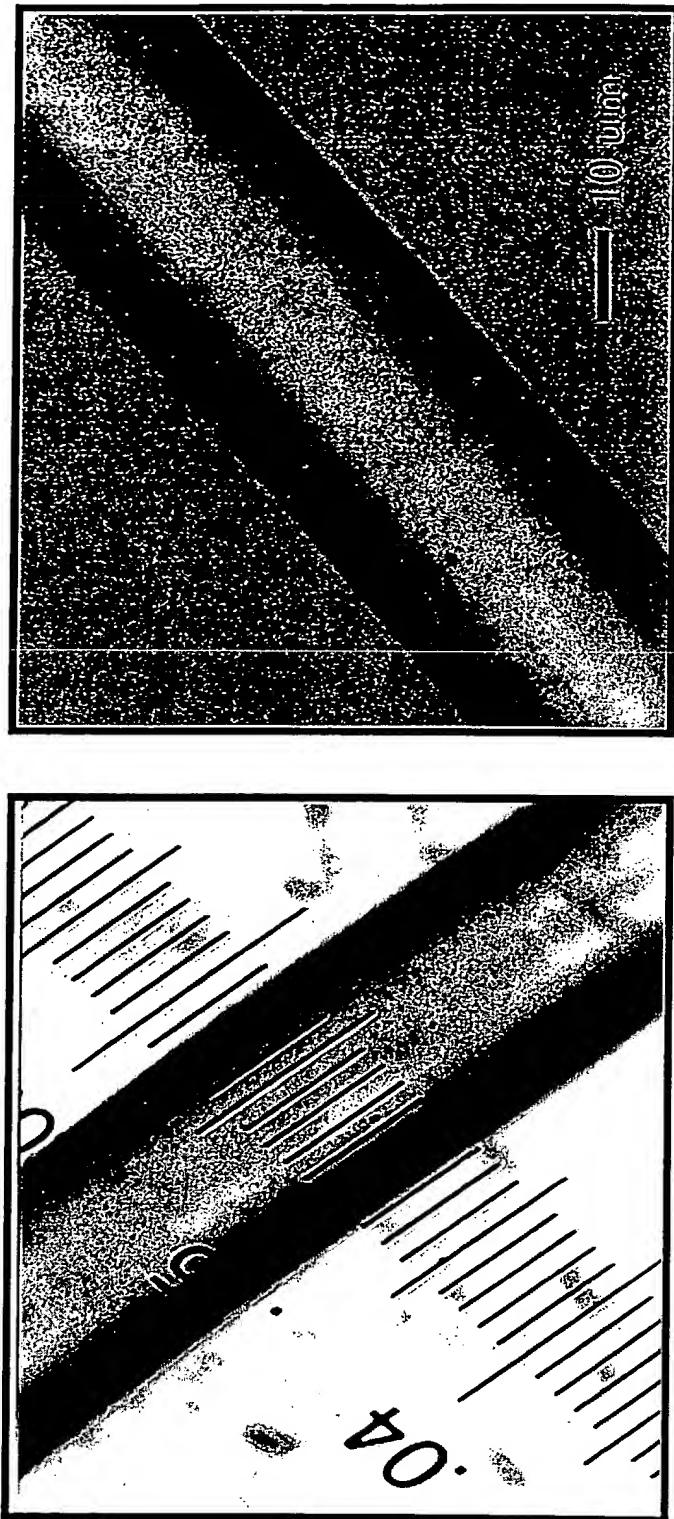


Polarized light w/tint plate



Figure 18

$pQE[(SP1)_4/(SP2)_1]_4$ fiber under light microscopy. Spun from a 12.5% protein solution into 90% methanol coagulation bath.



Polarized light
w/ tint plate

White light